



- Arriving at a site after sunset and quietly listening for a period of 5-10 minutes;
- Recording weather (estimated temperature, wind speed and direction, cloud cover, precipitation and moon) and other relevant details (e.g. location, date, start time, ecologists' names);
- Playing the prerecorded calls of the target mammal species through the megaphone for a period of 35 minutes;
- Listening for at least 10 minutes for any mammals that call in response to the projected calls; and
- Spotlighting nearby trees to see if any mammals have been called in.

Mammal call playback was undertaken at 17 locations along the survey corridors. Mammal call playback survey locations are indicated in red and yellow within Figure 3. Mammal Call playback was conducted on separate nights to Owl Call playback.

Frog Surveys

A typical frog survey involved at least one the following three techniques:

- The ecologists arrived at a site after sunset and recording weather (estimated temperature, wind speed and direction, cloud cover, precipitation and moon) and other relevant details (e.g. location, date, start time, ecologists names). They would then listen for frog calls for a period of at least 10 minutes;
- At a number of wetland and waterway locations, call playback for the threatened Growling Grass Frog *Litoria raniformis* was undertaken for a period of 10 minutes during this period of frog listening. This survey technique involves projecting a call of the Growling Grass Frog. During the breeding season, male Growling Grass Frogs will often respond with their own calls to this projected call. At least five minutes of listening was undertaken after projecting a Growling Grass Frogs call; and
- Where access can be obtained, and where it will not disturb stock animals, spotlighting was conducted around the edges of wetlands or waterways to search for the presence of frogs. Spotlighting involved the ecologists using a 55-watt spotlight beam, connected to a battery pack with a capacity of 20-ampere hours at 12 volts.

Frogs were recorded based on observations or their distinctive calls. Where a frog call is not immediately identified, the call is recorded on a handheld dictaphone for later identification.

Frog surveys were undertaken at a total of 47 locations along the survey corridors. These locations are indicated by red, yellow and green within Figure 3.

Active Reptile and Frog Searching



Reptile and Frog searches involve two ecologists actively searching underneath rocks, logs, bark and other debris for a period of at least 20 minutes (and more than an hour throughout Sugarloaf Reservoir Reserve and Toolangi State Forest).

Active searches for reptiles were undertaken within sites along the pipeline alignment considered to contain potentially suitable habitat for the Striped Legless Lizard and other reptile species.

Active searches for frogs were undertaken within sites along the pipeline alignment considered to contain potentially suitable habitat for the Brown and Southern Toadlets.

Frogs were captured (where possible) for identification. Other distinctive species were recorded by sightings only.

In total, 269 separate active frog searches were conducted along the survey corridors⁶⁸.

Pitfall Traps, Reptile Collapsible Traps and Active Reptile Searches

Pitfall traps were utilised throughout areas of the survey corridor where the topography was flat and it was safe to access with a post hole digger. Transects of pitfall traps each contained five holes and were deployed within the suitable habitat throughout the survey corridor within properties where access was available. Throughout areas of the survey corridor where trapping was not suitable reptile collapsible traps were used⁶⁹. Two transects of collapsible reptile traps were deployed with five traps each within each fauna survey site.

The use of collapsible pitfall and reptile traps to survey reptiles was undertaken at 24 locations within the survey corridor. These locations are indicated in red and blue within Figure 3⁷⁰.

Predator Scat Analysis

Faeces and pellets can be used as an indirect method of determining the presence of an animal at a site or in the nearby area. For the dropping and pellets of predators, they can be analysed to determine the identity of the species that made the dropping or pellet, and they can also be analysed to determine the identity of prey items consumed by the predator.

⁶⁸ All survey sites (indicated in red, yellow, blue and green) located on the fauna survey locations map were surveyed for reptiles and frogs using the active searches technique. The locations of reptile and frog surveys on private properties are not indicated on mapping due to stakeholder privacy

⁶⁹ Throughout areas of Toolangi Forest and Sugarloaf Reservoir

⁷⁰ Areas surveyed for reptiles within private properties throughout the Yea Rise LU were accessed under Section 33 of the Water Act



Predator scats were identified and collected from sites within the survey corridor and were sent to 'Dead Finish', Genoa, Victoria for analysis.

In total, 269 separate Predator Scat searches were conducted along the survey corridors⁷¹. The results of this analysis have been incorporated into Appendix I.

⁷¹ All survey sites (indicated in red, yellow, blue and green) located on the fauna survey locations map were surveyed for predator scats using the active searches technique. The locations of predator scat surveys on private properties are not indicated on mapping due to stakeholder privacy



Appendix D Definition of Significance



Definition of Significance

Significance is defined by the Oxford Dictionary as “noteworthy, of considerable importance”. However, when defining the conservation significance of species, communities and sites, more-detailed scientific definitions are required.

Species

The conservation status of a species is determined by legislation, policy and other relevant documents prepared at a Commonwealth and State level. All species considered ‘threatened’ or ‘significant’ within this report are listed as one (or more) of the following:

- Flora or fauna listed as extinct, extinct in the wild, critically endangered, endangered, vulnerable or conservation dependent in Australia under the Environment Protection and Biodiversity Conservation Act (EPBC) 1999.
- Flora or fauna listed as threatened in Victoria under Schedule 2 of the *FFG Act 1988*;
- Flora listed as presumed extinct, endangered, vulnerable or rare in Victoria in the Victorian DSE Flora Information System (2005 version); or
- Fauna listed as extinct, regionally extinct, extinct in the wild, critically endangered, endangered, vulnerable, near threatened or data deficient in the Advisory List of Threatened Vertebrate Fauna in Victoria, 2007 (DSE 2007b).

Ecological Communities

Ecological communities may include floral and/or faunal communities. The conservation status of a community is determined by legislation, policy and other relevant documents prepared at a Commonwealth and State level. All ecological communities are considered ‘threatened’ or ‘significant’ within this report are listed as one (or more) of the following;

- Ecological communities listed as critically endangered, endangered or vulnerable in Australia under the Environment Protection and Biodiversity Conservation Act 1999.
- Listed as threatened in Victoria under Schedule 2 of the *FFG Act 1988*; or
- Listed as an EVC that is presumed extinct, endangered, vulnerable or rare across most bioregions in which it occurs in Victoria (DSE 2002, unpubl. data).

Habitat Assessment

Floristic and structural features of vegetation form a habitat type, which provides a set of resources that support a community of fauna. Habitat types correspond broadly to vegetation communities.



However, lines drawn around these habitats do not represent rigid boundaries, as many species move between habitats or utilise more than one habitat according to changing conditions or seasons.

The value of a habitat will assist in the final determination of significance. This is determined by a number of features, including:

- Habitat status;
- Size/connectivity;
- Condition;
- Significant species; and
- Other features.

Three categories are used to measure habitat value:

- **High value:** Ground flora containing a high number of indigenous species; vegetation community structure, ground, log and litter layer intact and undisturbed; a high level of breeding, nesting, feeding and roosting resources available; a high richness and diversity of native fauna.
- **Moderate value:** Ground flora containing a moderate number of indigenous species; vegetation community structure, ground log and litter layer moderately intact and undisturbed; a moderate level of breeding, nesting, feeding and roosting resources available; a moderate richness and diversity of native fauna.
- **Low value:** Ground flora containing a low number of indigenous species, vegetation community structure, ground log and litter layer disturbed and modified; a low level of breeding, nesting, feeding and roosting resources available; a low richness and diversity of native fauna.

Other features, such as the habitat's value as a habitat corridor, or the presence of remnant communities within the habitat, or unusual ecology or community structure of the habitat, may also be used to assess habitat quality and value.



Appendix E EVC Descriptions

E.1.1 EVC descriptions

Lowland Forest (EVC 16) – Least Concern (Highlands Northern Fall Bioregion)

This EVC is found growing on lowland plains and lower foothill slopes on a wide range of well-drained soils types of moderate fertility (DSE 2007, Oates and Taranto 2001). The overstorey stratum of this forest is dominated by eucalypts to 25 m tall. The vegetation class is characterised by a diversity of life-forms (Oates and Taranto 2001).

Within the survey corridor this community occurs within the Toolangi North LU. The overstorey consists of a mixture of *Eucalyptus obliqua* (Messmate Stringybark) and *E. radiata* (Narrow-leaf Peppermint). Common tall shrubs amongst the understorey include *Hakea decurrens* subsp. *physocarpa* (Bushy Needlewood), *Kunzea ericoides* (Burgan) and *Acacia* spp. (Wattle). Other species that occur frequently within the understorey include *Banksia spinulosa* (Hairpin Banksia), *Spyridium parvifolium* (Dusty Miller), *Pultenaea muelleri* (Mueller's Bush-Pea) and *Olearia lirata* (Snowy Daisy-bush). Ground layer species include *Astroloma humifusum* (Cranberry Heath), *Viola hederacea* (Ivy-leaf Violet), *Lepidosperma laterale* (Variable Sword-sedge), *Pteridium esculentum* (Austral Bracken), *Joycea pallida* (Silvertop Wallaby-grass), *Tetrarrhena juncea* (Forest Wire-grass), *Amperea xiphoclada* (Broom Spurge), *Drosera peltata* (Pale Sundew), *Xanthorrhoea minor* (Small Grass-tree), *Lagenophora* spp. (Bottle Daisy) and *Hydrocotyle hirta* (Hairy Pennywort).

Riparian Forest (EVC 18) – Least Concern (Highlands Southern Fall Bioregion)

Riparian Forest occurs along river banks and associated alluvial terraces with occasional occurrences in the heads of gullies leading into creeks and rivers. It occurs on fertile alluvial soil that is regularly inundated and permanently moist. The vegetation is dominated by tall eucalypts up to 30-40 m tall. There is an open to sparse secondary tree layer of wattles and scattered dense patches of shrubs, ferns grasses and herbs (Oates and Taranto 2001).

Within the survey corridor this EVC occurs within the Steels Creek Flats and Upper Yea River Riparian Forest Landscape Units. The overstorey is dominated by *Eucalyptus viminalis* subsp. *viminalis* (Manna Gum), with a tall tree or shrub layer consisting mostly of *Acacia melanoxylon* (Blackwood) and *Ozothamnus ferrugineus* (Tree Everlasting). In wetter areas, ferns such as *Cyathea australis* (Rough Tree-fern) may also be present in the understorey. *Clematis aristata* (Mountain Clematis) can be found climbing on trees and shrubs. The lower understorey consists mostly of *Goodenia ovata* (Hop Goodenia) and *Pteridium esculentum* (Bracken). At the ground



layer there are a wide range of both native and introduced herbs and graminoids. Native graminoids present include *Carex appressa* (Tall Sedge), *Poa ensiformis* (Sword Tussock-grass), *Lomandra longifolia* (Spiny-headed Mat-rush), and *Dianella tasmanica* (Tasman Flax-lily). The herbaceous component of the understorey is mostly represented by *Senecio minimus* (Shrubby Fireweed) and *Acaena novae-zelandiae* (Bidgee Widgee). The most abundant introduced species found at the sites where this vegetation community occurs are *Rubus fruticosus* (Blackberry) and grasses and herbs such as *Anthoxanthum odoratum* (Sweet Vernal-grass), *Dactylis glomerata* (Cocksfoot), *Holcus lanatus* (Yorkshire Fog), *Hypochoeris radicata* (Cat's Ear) and *Prunella vulgaris* (Self-heal).

Heathy Dry Forest (EVC 20) – Least Concern (Highlands Southern Fall bioregion)

Heathy Dry Forest occurs on exposed upper slopes and ridgelines of moderate to high rainfall areas. This community tends to grow on shallow rocky soils with low fertility or water holding capacity. The overstorey tends to be relatively low and dominated by eucalypts to 20m tall. The understorey is typically comprised of a sparse to dense layer of ericoid shrubs growing over a ground layer sparsely covered in a variety of grasses (Oates and Taranto 2001).

Within the survey corridor this community is found growing on the exposed north-south running spur at the southern end of the Toolangi South LU. The overstorey is co-dominated by *Eucalyptus macrorhyncha* (Red Stringybark) and *E.radiata* (Narrow-leaf Peppermint), with *E. goniocalyx* (Bundy) and *E. polyanthemos* (Red Box) also common. The understorey consists of a low shrub layer characterised by *Acrotriche prostrata* (Trailing Ground-berry), *A.serrulata* (Honey-pots), *Epacris impressa* (Common Heath) and *Acacia verniciflua* (Varnish Wattle). Other species found within the mid-story include *Daviesia leptophylla* (Narrow-leaf Bitter-pea) and *Pultenaea scabra* (Rough Bush-Pea). The ground layer is dominated by *Joycea pallida* (Silvertop Wallaby-grass), *Lomandra filiformis* (Wattle Mat-Rush), *Gonocarpus tetragynus* (Common Raspwort), *Wahlenbergia* spp. (Bluebell) and *Hardenbergia violacea* (Purple Coral-Pea).

Grassy Dry Forest (EVC 22) – Least Concern (Highlands Southern Fall Bioregion)

Grassy Dry Forest occurs at low elevations (40 - 350m) on exposed aspects or on sheltered slopes in lower rainfall areas. It occurs on a range of geologies including Devonian and Silurian sedimentary soils north-east of Melbourne and Ordovician sediments to the west of Melbourne (Oates and Taranto 2001). The structure of the community can vary from an open forest to woodland up to 20m tall. The understorey usually consists of a sparse shrub layer over a highly diverse ground layer of drought-tolerant grasses, herbs and forbs as well as a number of hardy fern species.



Within the survey corridor this EVC occurs on exposed ridges and drier north and west-facing slopes within Sugarloaf Reservoir and the hills south of Toolangi State Forest. The vegetation condition within the community generally ranges from moderate to good, with few weed species normally present. The overstorey is dominated by *Eucalyptus goniocaly*. (Bundy), *E. macrorhyncha* (Red Stringybark) and *E. polyanthemos* (Red Box). The midstorey is typically extremely sparse and consists only of a scattering of shrubs and small trees, the most common being *Acacia mearnsii* (Black Wattle) and *Exocarpos cupressiformis* (Cherry Ballart). The ground layer is dominated by a wide variety of native grasses and forbs. Common native grasses include *Joycea pallida* (Silver-top Wallaby-grass), *Microlaena stipoides* var. *stipoides* (Weeping Grass) and *Poa rodwayi* (Velvet Tussock-grass). A rich array of native herbs and forbs occur within this plant community including a large number of orchids. Dominant species within the ground layer include *Dichondra repens* (Kidney weed), *Hydrocotyle hirta* (Hairy Pennywort), *Senecio tenuiflorus* (Slender Fireweed), *Thysanotus patersonii* (Twining Fringe-lily) and *Drosera peltata* (Pale Sundew).

Herb-rich Foothill Forest (EVC 23) - Least Concern (Highlands Southern Fall and Highlands Northern Fall Bioregions)

This community occurs as a medium to tall open forest or woodland to 30m tall. It is typically found growing on fertile, well-drained clay loam soils on a range of geologies in areas with moderate to high rainfall. It characteristically has a herb-rich ground layer with a wide diversity of forbs and grasses (Oates and Taranto 2001). It is most often found on easterly and southerly aspects (sheltered slopes), and in low rainfall areas it most commonly occurs in gullies. As rainfall increases it can also be found on more exposed aspects.

The condition of the vegetation is good within Toolangi State Forest, but varies from poor to good elsewhere within the survey corridor. The overstorey is typically dominated by a mixture of *Eucalyptus obliqua* (Messmate Stringybark) and *E. radiata* (Narrow-leaf Peppermint), and often also includes *E. cypellocarpa* (Mountain Grey-gum). The understorey is characterised by a sparse to moderately dense shrub layer dominated by *Coprosma quadrifida* (Prickly Currant-bush), *Cassinia aculeata* (Common Cassinia), *Spyridium parvifolium* (Dusty Miller) and *Leptospermum scoparium* (Manuka). *Pteridium esculentum* (Austral Bracken) also forms a conspicuous part of this community, and is especially dense in localised areas. A large portion of the ground layer comprises grasses and sedges, with the most common being *Tetrarrhena juncea* (Forest Wire-grass) and *Lomandra longifolia* (Spiny-head rush). Forbs and small shrubs are also prevalent amongst the ground layer vegetation. Common species include *Burchardia umbellata* (Milkmaids), *Platylobium formosum* (Handsome Flat-pea), *Tetradthea ciliata* (Pink-bells), *Hydrocotyle hirta* (Hairy Pennywort) and *Viola hederacea* (Ivy-leaf Violet).



Damp Forest (EVC 29) – Least Concern (Highlands Southern Fall, Highlands Northern Fall Bioregions)

Damp Forest usually occurs on a diverse range of fertile, deep, well-structured soils. The EVC is dominated by tall eucalypts 30 - 40m tall with the understorey usually consisting of a shrub layer dominated by a mixture of broad-leaved species and small-leaved prickly shrubs at the drier spectrum of the EVC. Common components amongst the ground layer vegetation include a wide variety of forbs, grasses and moisture-dependant ferns (Oates and Taranto 2001). Damp Forest occurs across a range of altitudes (40 - 780 m) although it is more often found at higher elevations and usually will only grow at low elevations where rainfall is high (Oates and Taranto 2001).

Within the survey corridor this community occurs in gullies and topographically protected areas on westerly-facing slopes within Toolangi State Forest. The overstorey is dominated by *Eucalyptus cypellocarpa* (Mountain Grey-gum), *E. obliqua* (Messmate Stringybark) and *E. radiata* (Narrow-leaf Peppermint) over a diverse midstorey characterised by *Coprosma quadrifida* (Prickly Currant-bush), *Acacia dealbata* (Silver Wattle) and *Bedfordia arborescens* (Blanket-leaf). Other common understorey species include *Calochlaena dubia* (Common Ground-fern), *Pteridium esculentum* (Austral Bracken), *Goodenia ovata* (Hop Goodenia) and *Cyathea australis* (Rough Tree-fern). Major species of the ground layer include *Tetrarrhena juncea* (Forest Wire-grass), *Viola hederacea* (Ivy-leaf Violet), *Hydrocotyle hirta* (Hairy Pennywort), *Microlaena stipoides* (Weeping Grass), *Arthropodium* spp. (Vanilla Lily) and *Drosera peltata* (Pale Sundew).

Wet Forest (EVC 30) – Least Concern (Highlands Southern Fall, Highlands Northern Fall Bioregions)

Wet Forest is found on well-drained loamy soils with relatively high fertility. In moderate rainfall areas this EVC can typically be found growing in protected gullies and southerly aspects although as rainfall increases it will grow on any aspect (DSE 2007a, Oates and Taranto 2001). The EVC is often characterised by a tall overstorey of eucalypts to 70m tall, with occasional trees scattered through the understorey and a ground layer that is usually dominated by a variety of ferns that thrive in moist, shaded environments.

Within the survey corridor this EVC is restricted to a moist gully within the Toolangi North landscape unit. The overstorey is dominated by *Eucalyptus obliqua* (Messmate Stringybark) over a midstorey dominated by *Coprosma quadrifida* (Prickly Currant-bush), *Cyathea australis* (Rough Tree Fern), *Hedycarya angustifolia* (Austral Mulberry), *Pomaderris aspera* (Hazel Pomaderris) and *Acacia dealbata* (Silver Wattle). There is a wide diversity of ferns growing within the ground layer including *Blechnum fluviatile* (Ray Water-fern), *B. nudum* (Fishbone Water-fern), *Adiantum aethiopicum* (Common Maidenhair), *Polystichum proliferum* (Mother Shield-fern) and *Calochlaena dubia* (Common Ground Fern). Other common species within the ground layer